

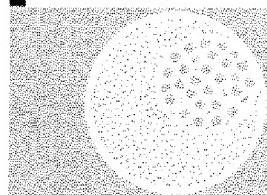
EXHIBIT 2


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Tosoh Bioscience LLC: The Chemistry of Innovation

Process Media Products

In this section

[Ion Exchange \(IEC\)](#)[Hydrophobic Interaction \(HIC\)](#)[Affinity \(AFC\)](#)[Size Exclusion \(SEC\)](#)

Toyopearl HW-40

Toyopearl HW-50

Toyopearl HW-55

Toyopearl HW-65

Toyopearl HW-75

Size Exclusion Chromatography

Toyopearl HW and TSK-GEL PW size exclusion resins are the foundation for all of Tosoh's ion exchange, hydrophobic interaction, and affinity process media.

After an initial polymerization reaction to create the designated particle size and pore size, the resin surface is chemically modified to create the desired final product.

Toyopearl HW Size Exclusion Beads

Toyopearl HW products are hydroxylated methacrylic polymer resins. Toyopearl HW beads are made commercially in many different pore sizes and particle diameters (30 micron and larger).

They vary from TSK-GEL PW beads by having a lower degree of crosslinking. Lower crosslinking makes available a larger number of resin sites for ligand immobilization when producing Toyopearl HW based ion exchange and hydrophobic interaction chromatography resins.

Therefore a functionalized Toyopearl HW resin will have a higher dynamic binding capacity than the corresponding TSK-GEL PW material.

Because similarly functionalized HW and PW resin types have the same backbone polymer chemistry, the selectivity for proteins and impurities remains the same.

Toyopearl HW based resin products can be used at high linear velocities and withstand operating pressures up to 3 bar.

Comparison of Toyopearl HW resins and TSK-GEL PW resins offered by Tosoh Bioscience

Pore size(Å)	50	125	400-500	750	1000	>1000	>1700
Toyopearl HW:	40	50	55	60	65	75	80
TSK-GEL PW:	1000	2000	4000		5000	6000	

Increasing pore surface area

TSK-GEL PW High Performance Size Exclusion Beads

TSK-GEL PW products are hydroxylated methacrylic polymer resins. TSK-GEL PW beads are made commercially in many different pore sizes and particle diameters (30 micron and smaller).

They vary from Toyopearl HW beads by having a higher degree of crosslinking (necessitated by the higher flow pressures needed when using smaller particles for chromatography). This decreases the number of resin sites available for ligand immobilization when producing TSK-GEL PW ion exchange and hydrophobic interaction chromatography resins.

A functionalized TSK-GEL PW resin will have a lower dynamic binding capacity than the corresponding Toyopearl HW material.

However, chromatographic efficiency, peak width, and resolution are improved because of their smaller particle sizes. In this way they are higher performing chromatography resins than the HW based materials.

Because similarly functionalized HW and PW resin types have the same backbone polymer chemistry, the elution selectivity for proteins and impurities remains the same.

TSK-GEL PW based resin products can be used at high linear velocities and withstand operating pressures up to 20 bar.

Tosoh Bioscience LLC 156 Keystone Drive, Montgomeryville, PA, 18936 Tel: (215)



TOSOH BIOSCIENCE LLC

TOSOH

156 Keystone Drive, Montgomeryville, PA 18936

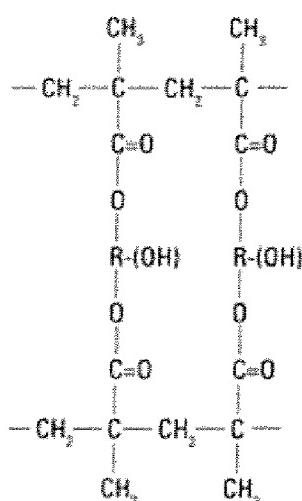
Orders and Services: 800-366-4875

Toyopearl HW-65

Toyopearl HW-65 is a hydroxylated methacrylic polymer bead for size exclusion chromatography of proteins between 40,000-5,000,000 Da. It also is the base bead for all Toyopearl "-650" designated products.

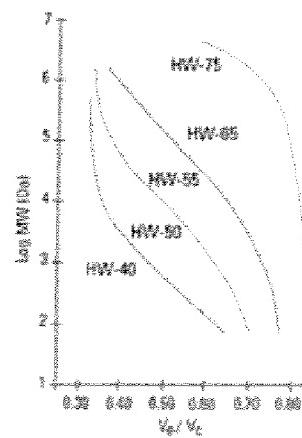
Structure:

Comparative information for SEC resins



Note: R = Hydroxylated Aliphatic Group

Calibration curves for globular proteins on
Toyopearl HW resins

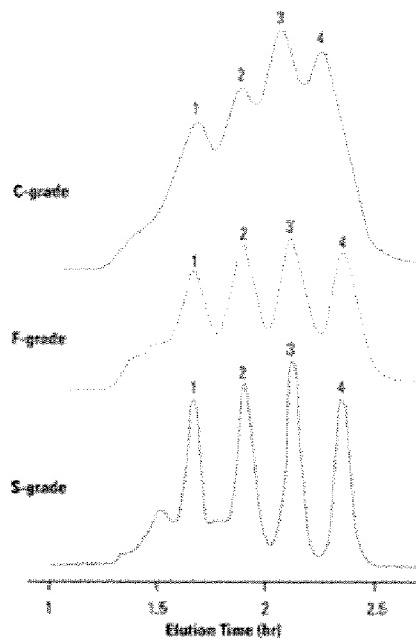


Column: 22mmID x 30cm
Sample: protein standards
Elution: 0.06M phosphate buffer (pH 7.0) in 0.06M KCl
Legend: V_e = elution volume V_t = column volume

Product Attributes:

Pore size (mean):	1,000Å
Exclusion limit:	5,000,000 Da
Particle size (mean):	45µm (F-grade) 30µm (S-grade)
Pressure rating:	3 bar
Shipping buffer	20% ethanol
pH stability:	2-13
shelf life:	10 years

Typical resolution changes based on particle size

Literature:**Size Exclusion Chromatography**

Column: Toyopearl HW-65, 26mmID x 70cm
 Eluent: 33.3mM phosphate buffer (pH7.0), 0.2M NaCl
 Flow rate: 106mL/h (20cm³)
 Temp.: 25C
 Detector: UV @280nm
 Sample: 1. Thyroglobulin (0.3%), 2. γ -Globulin (0.3%)
 3. β -Lactoglobulin (0.3%), 4. Cytochrome C (0.1%)
 Inj. Vol.: 1mL

Ordering information:

(For quantities up to 1L please download our Price List; for pricing above 1L or to place your order, please contact customer service)

P/N	Description	Resin volume	Particle size
19814	Toyopearl HW-65F	150mL	30-60 μ m
07465	Toyopearl HW-65F	500mL	30-60 μ m
14689	Toyopearl HW-65F	1L	30-60 μ m
08069	Toyopearl HW-65F	5L	30-60 μ m
19815	Toyopearl HW-65S	150mL	20-40 μ m
07467	Toyopearl HW-65S	250mL	20-40 μ m
07464	Toyopearl HW-65S	500mL	20-40 μ m
14688	Toyopearl HW-65S	1L	20-40 μ m
08068	Toyopearl HW-65S	5L	20-40 μ m

EXHIBIT 3



TOSOH BIOSCIENCE LLC

TOSOH

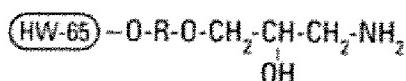
156 Keystone Drive, Montgomeryville, PA 18936

Orders and Services: 800-366-4875

Toyopearl AF-Amino-650

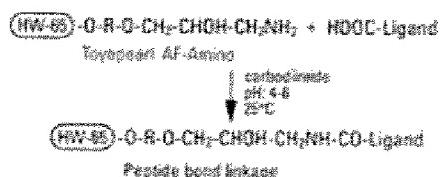
Toyopearl AF-Amino-650 is a reactive resin used for the coupling of specific ligands for affinity chromatography. Ligands are immobilized by either peptide bond formation or reductive amination through their respective carboxylate or aldehyde groups.

Structure:



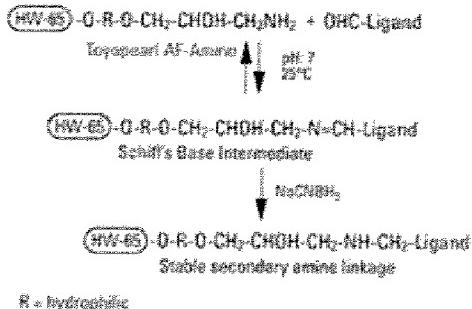
Approximate Ligand Density: 100μmol/mL

Coupling procedure



Product Attributes:

Pore size (mean):	1,000Å
Particle size (mean):	65μm (M-grade)
Pressure rating:	3 bar
Shipping buffer:	20% ethanol
pH stability:	2-13
Shelf life:	10 years



Literature:

Affinity Chromatography

Ordering information:

(For quantities up to 1L please download our Price List; for pricing above 1L or to place your order, please contact customer service)

P/N	Description	Resin volume	Ligand density
43411	Toyopearl AF-Amino-650M	10mL	70 - 130μeq/mL
08002	Toyopearl AF-Amino-650M	25mL	70 - 130μeq/mL
08039	Toyopearl AF-Amino-650M	100mL	70 - 130μeq/mL

18074	Toyopearl AF-Amino-650M	1L	70 - 130µeq/mL
18316	Toyopearl AF-Amino-650M	5L	70 - 130µeq/mL